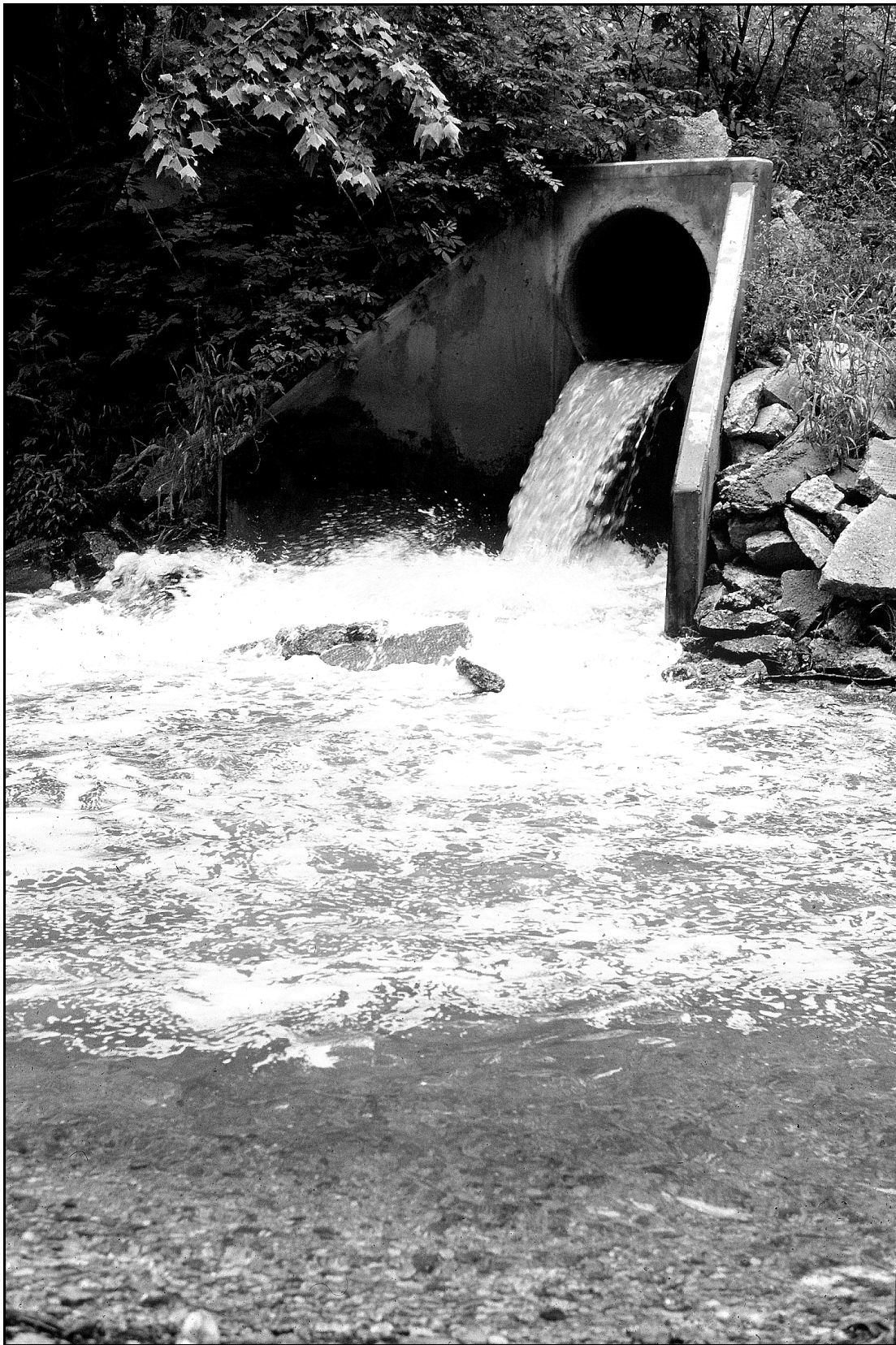


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Water Pollution Control Program



Brazos River Authority Wastewater Treatment Plant discharge to Nolan Creek

Water Pollution Control Program

The TNRCC administers the state water quality management programs with the goal of protecting, maintaining, and restoring the water resources of Texas in accordance with Chapter 26 of the TWC. TNRCC programs are funded from a variety of sources, such as general revenue appropriated by the Texas Legislature, annual fee assessments on all waste discharge permittees and on many surface water users authorized to withdraw water, as well as federal grants that are administered by the EPA under the CWA. The TNRCC provides comprehensive descriptions of state water quality management in a document entitled *Water Quality Management Program: Continuing Planning Process* (TNRCC, 1999c).

Watershed Approach

The management of water resources in Texas relies on a host of local, state, and federal programs and participants to manage, protect, and maintain public health and the environment. However, it is recognized that planning and management activities for the state's water resources are fragmented due to multiple jurisdictional boundaries, statutory limitations, and the distinct classification of surface and ground water into separate resources. Furthermore, driven by program-centered objectives and funding, water resource programs and participants lack the flexibility and coordination necessary to address water quantity and water quality issues simultaneously. While significant progress has been made in Texas to protect water resources, public health and water resources continue to be impaired from a variety of complex sources. To address these issues, a comprehensive approach to better coordinate water resource management activities geographically by river basin or watershed has been implemented at the TNRCC.

Consistent with statutory direction from the 1991 Texas Legislature, the TNRCC made a strategic change in its water quality management program. The Texas Water Code, §§26.0135, 26.0136, and 26.0285, all specify watershed-oriented management of TNRCC and local government water-quality-related activities. These statutes authorize the CRP, which serves as the foundation for watershed management in Texas. Section 26.0285 specifies that the TNRCC shall issue Texas Pollution and Discharge Elimination System (TPDES) permits with consideration of the watershed into which the discharge will occur. The watershed-based permitting cycle is established in the TNRCC rules at 30 TAC §305.71.

The guidance for surface water quality management programs to implement their day-to-day activities using a watershed approach is described in *The Statewide Watershed Management Approach for Texas* (TNRCC,

1997b). The approach implements a basin management cycle establishing five sequenced activity phases that are repeated for each basin at fixed five-year intervals (Figure 49). This ensures that management goals, priorities, and implementation strategies are routinely updated and progressively implemented. The TNRCC has oriented its water quality inventory reporting [CWA §305(b)] and listing of impaired water bodies [CWA §303(d)] into a basin cycle, completing the assessment on one-fifth of the state every year, rather than assessing water bodies statewide every two years.

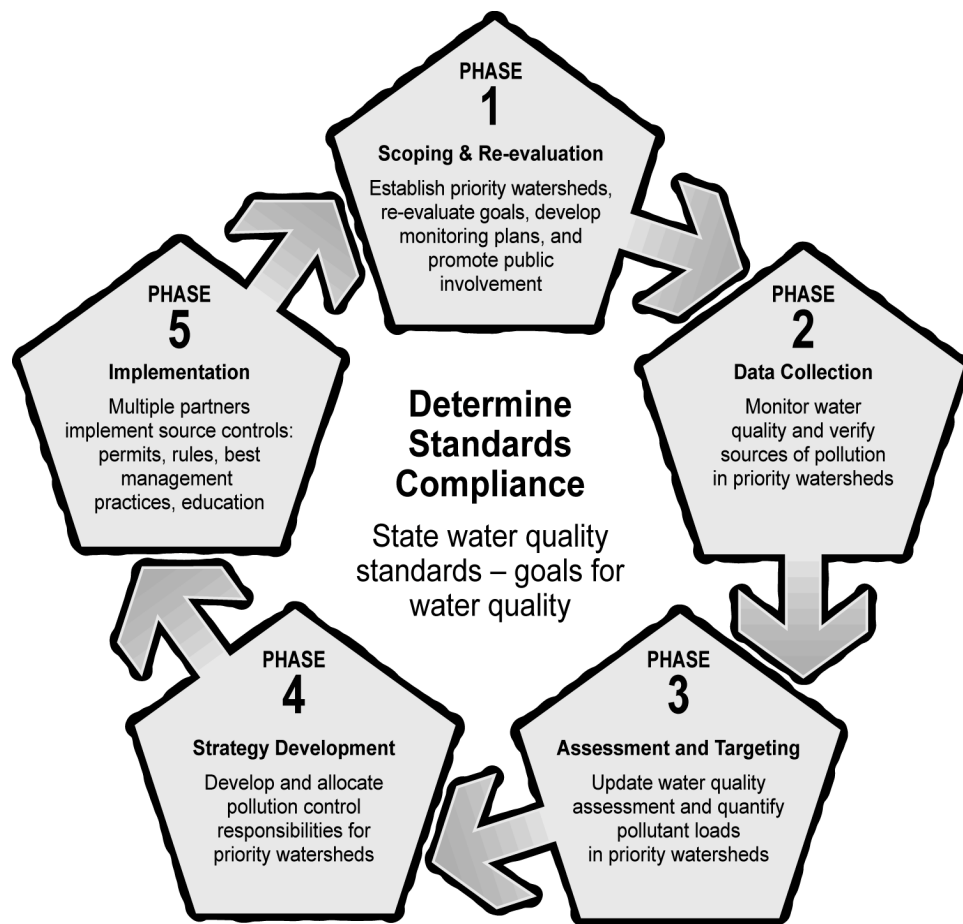
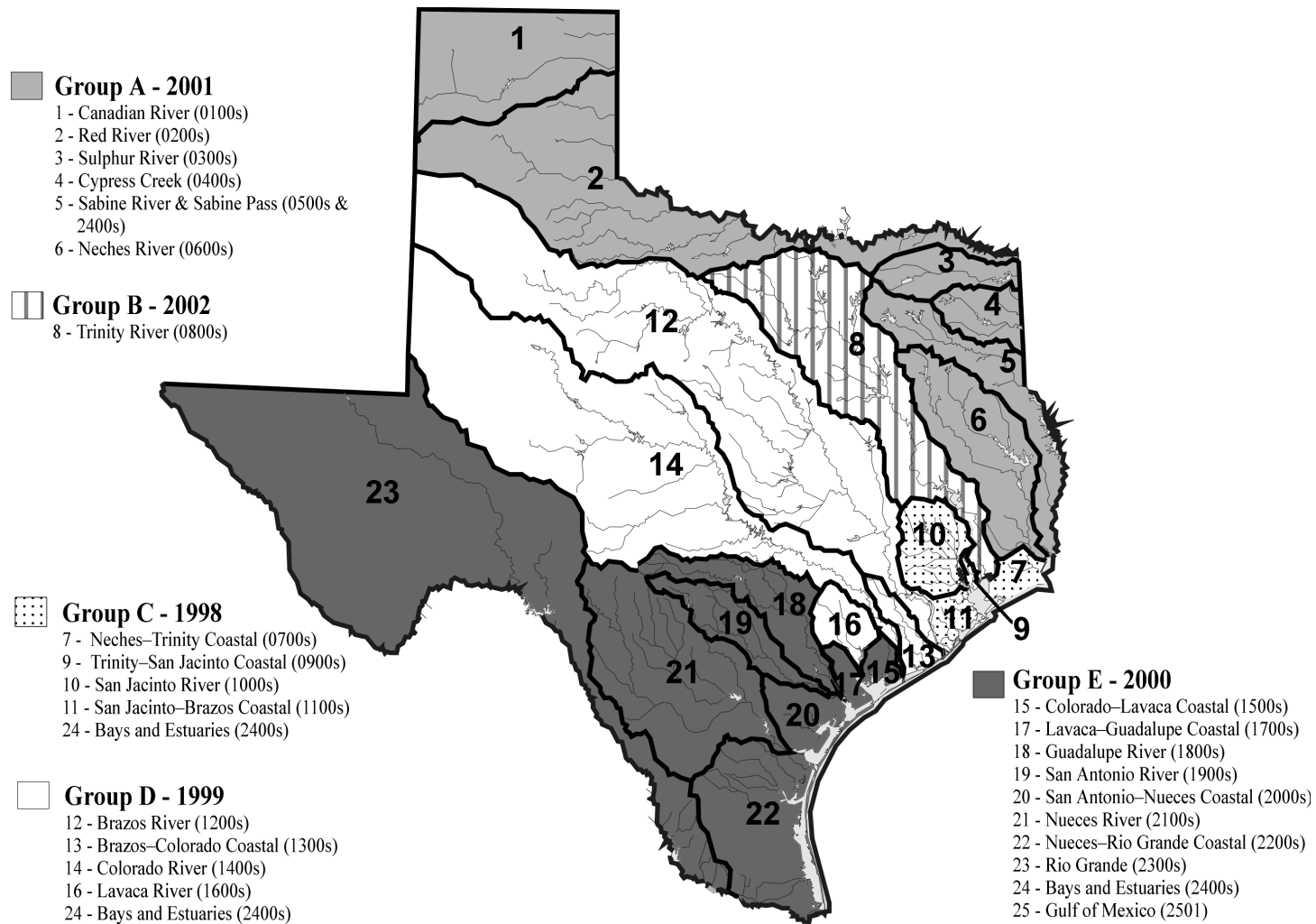


Figure 49. The Five-Year Basin Management Cycle

The 305(b) assessment is conducted within one of the five basin groups established by the TNRCC for wastewater discharge permitting and watershed management purposes (Figure 50). The permit-by-basin groups were defined programmatically to equalize the number of permits, with each of the five groups comprising about one-fifth of the state's total. Both the 1998 and 1999 305(b) assessments and 303(d) lists were focused

Figure 50. TNRCC Watershed Management Planning Areas



on two basin planning groups, rather than one as the management cycle would suggest, to accommodate the transition from the previous approach of revising the entire state every two years. The priority geographic areas for the 1998 305(b) assessment and 303(d) list were basin groups B and C, while basin groups D and E were evaluated for the 1999 assessment and list. Beginning with the year 2000 305(b) assessment and 303(d) list, which focus on Basin Group A, only one basin group will be assessed each year.

Once the rotating five-year cycle is fully implemented, the TNRCC and basin stakeholders focus the next four years on addressing issues identified in the 305(b) assessment or 303(d) listing before priorities are changed or adjusted in the next cycle for a basin group. The statewide watershed management schedule shows the time line of how monitoring and assessment phases precede development and implementation of TMDLs or watershed action plans in each of the five basin groups through the year 2005 (Figure 51). This scheduling allows implementation of wasteload allocations into TPDES permits to occur in an efficient managed fashion. The TNRCC's intent is to allow sufficient time for development and implementation of control strategies and for tracking the status and trends in surface water quality.

The following key elements and basic steps of surface water quality management are oriented into the TNRCC's watershed management approach:

Monitor Instream Surface Water Conditions, in order to (1) determine baseline water quality, (2) determine appropriate instream standards, and (3) obtain sufficient data for predicting pollutant impacts. Data sources include the TNRCC statewide SWQMP fixed station network, contractors collecting data under the CRP, data from other state and federal agencies, TNRCC intensive surveys and special studies, receiving water assessments conducted by TNRCC regional offices, data supplied by permittees, additional local and regional monitoring programs, and citizens' volunteer monitoring (Texas Watch).

Set Surface Water Quality Standards, in order to establish instream water quality goals. The TSWQS have been promulgated as Title 30, Chapter 307, of the TAC (TNRCC, 1997a). Standards are reviewed and revised at least every three years to address new state and federal initiatives, to incorporate new data and information, and to address public concerns. State water quality standards are approved by the EPA in accordance with Section 303(c) of the CWA.

Figure 51. The Statewide Basin Management Schedule

River and Coastal Basins	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006
Group A: Canadian River, Red River, Sulphur River, Cypress Creek, Sabine River, Neches River				Scoping				
	Data Collection	Baseline Monitoring		Data Collection			Baseline Monitoring	
	Assess & Target					Assessment & Targeting		
		Strategy Development					Strategy Development	
			Implementation					Implementation
Group B: Trinity River					Scoping			
	Data Collection		Baseline Monitoring		Data Collection			Baseline Mon.
		Assessment & Targeting					Assessment & Targeting	
			Strategy Development					Strategy Dev.
				Implementation				
Group C: Neches–Trinity Coastal, Trinity–San Jacinto Coastal, San Jacinto River, San Jacinto–Brazos Coastal	Scoping					Scoping		
	Data Collection			Baseline Monitoring		Data Collection		
			Assessment & Targeting					Assess & Target
				Strategy Development				
					Implementation			
Group D: Brazos River, Brazos–Colorado Coastal, Colorado River, Lavaca River		Scoping					Scoping	
	Baseline Mon.	Data Collection			Baseline Monitoring		Data Collection	
				Assessment & Targeting				
					Strategy Development			
						Implementation		
Group E: Colorado–Lavaca Coastal, Lavaca–Guadalupe Coastal, Guadalupe River, San Antonio River, San An- tonio–Nueces Coastal, Nueces River, Nueces–Rio Grande Coastal, Rio Grande			Scoping					
	Baseline Monitoring		Data Collection			Baseline Monitoring		
					Assessment & Targeting			
	Strategy Development					Strategy Development		
		Implementation					Implementation	

Note: Chronological order of river basins is derived from Title 30 Texas Administrative Code §305.71 Permit-by-Basin rule. Wastewater permits are issued to coincide with the implementation phase.

Assess Pollutant Input, in order to determine the amount of pollutant loading from various sources that can be assimilated without violating water quality standards or degrading water quality. Predicative mathematical models are applied to various sources of loadings of oxygen-demanding materials, toxic substances, and other potential pollutants. The results provide an estimate of the level of pollutant control needed in order to maintain water quality standards. The impacts of individual discharges of treated wastewater are evaluated on a permit by permit basis. Under the CRP, assessments of water quality and pollutant impacts are coordinated for entire watersheds. In addition, total maximum daily loads are developed to assess the cumulative impacts of multiple discharges to water bodies. These evaluations can include an assessment of nonpoint sources as well as permitted point source discharges.

Limit Pollutant Input, in order to ensure that water quality standards and other requirements are maintained. For permitted wastewater discharges, effluent limitations are established in accordance with the TNRCC document entitled *Implementation of the Texas Surface Water Quality Standards via Permitting* (TNRCC, 1995a). Typical permit requirements can include effluent limitations for total suspended solids, biochemical oxygen demand, pH, temperature, various dissolved salts, and toxic pollutants. Larger discharges also have requirements to conduct effluent toxicity biomonitoring with representative aquatic organisms. Under Section 401 of the CWA, the TNRCC also reviews and certifies federal permits issued by the U.S. Army Corps of Engineers for dredge and fill operations.

Enforce Permit Limits and Other Requirements, in order to ensure compliance with permitted levels that are needed to protect instream water quality. The TNRCC has the authority to levy administrative fines as a mechanism for enforcement.

Re-monitor, in order to determine whether water quality standards are being maintained, and to determine whether the existing water quality standards are appropriate. Continued monitoring provides the basic information to assess the effectiveness of water quality management. Data from river basins are assessed every two years under the CRP. In the Texas Water Quality Inventory, the TNRCC provides an extensive statewide assessment of how well individual water bodies in Texas comply with water quality standards. Statewide assessments of nonpoint source impacts are conducted under Section 319 of the CWA. Monitoring data are used to identify continuing problem areas, which are listed as impaired water bodies under Section 303(d) of the Act or identified as areas of concern. TMDLs, additional monitoring, and other management activities are carried out all on water bodies identified as impaired or where water

quality concerns exist. These activities are developed and carried out on a priority basis.

Texas Surface Water Quality Standards

The TSWQS, promulgated as Title 30, Chapter 307 of the Texas Administrative Code, establish explicit water quality goals throughout the state. Diverse sources have shaped standards development, including cities, industries, environmental interests, and the EPA, which has approval authority over state water quality standards.

Regional hydrologic and geologic diversity is given consideration by dividing major river basins, bays and estuaries into defined segments (referred to as classified or designated segments). The standards rule contains (1) general standards, which apply to all surface water in the state, and (2) segment-specific standards, which identify appropriate uses (aquatic life, contact or noncontact recreation, drinking water, and other uses) and list upper and lower limits for common indicators (criteria) of water quality, such as dissolved oxygen, temperature, pH, dissolved minerals, and fecal coliform bacteria.

Water quality standards are publicly revised approximately every three years in order to incorporate new information on potential pollutants and additional data about water quality conditions in specific water bodies, to obtain public input, and to address new state and federal regulatory requirements. The standards were revised during 1996/1997, and adopted by the TNRCC on May 19, 1997 and became effective on April 30, 1997 (TNRCC, 1997a). The 1997 TSWQS were used in the 2000 305(b) assessment, except in a few cases where the draft 2000 TSWQS were used to defer new listings (see pages 195,199,217, and 224).

A new triennial review began in early 1999, after which the TNRCC proposed revisions on February 4, 2000. New standards were adopted by the TNRCC on July 26, 2000 and require EPA approval (TNRCC, 2000a). Procedures for implementing the TSWQS into TPDES permits are described in *Procedures to Implement the Texas Surface Water Quality Standards* (TNRCC, 2000b).

Significant changes to the TSWQS occurred in 2000. The results of completed surface water assessments resulted in substantial revision of chloride, sulfate, and total dissolved solids criteria for many Texas water bodies. Use attainability analyses were completed to determine the appropriate aquatic life use of numerous unclassified waters in the state. This resulted in the additional partial classification of more than 100 additional water bodies in Appendix D of the TSWQS. In accordance with EPA guidance, TNRCC adopted new bacteriological indicators for

assessment of the attainment of the contact recreation use. The TNRCC will now transition from use of fecal coliform (except in designated oyster waters) to either *E. coli* in fresh water or Enterococci in salt water.

The TSWQS include several key sections which are essential to their overall effectiveness. The General Criteria (307.4) contain a variety of narrative statewide provisions which define the general goals to be attained by all waters in the state. These provisions are particularly important in dealing with those pollutants not addressed by specific numerical criteria. The General Criteria also specify procedures that are used to develop site-specific standards for small, unclassified water bodies.

The Antidegradation Policy (307.5) establishes extra protection for high-quality water bodies. In accordance with EPA requirements, this policy stipulates that no degradation will be allowed in high-quality waters, unless the resulting degradation is demonstrated to be economically and socially justified. The antidegradation policy also provides for establishing Outstanding National Resource Waters, in which no degradation is allowed under any circumstances.

Standards for Toxic Materials (307.6) include numerical criteria (as maximum instream concentrations) for 39 toxic pollutants in order to protect aquatic life. Human consumption of fish and drinking water is protected by numerical criteria for 64 toxic pollutants. This section also requires large dischargers to conduct whole effluent toxicity testing, which involves exposing selected aquatic organisms to samples of the discharge effluent. Any significant toxicity observed during the test must then be identified and eliminated.

Appropriate numerical criteria needed to support various water-quality related uses are defined in Section 307.7. Conditions under which portions of the standards do not apply - such as in mixing zones near discharge points, or at unusually low stream flows - are noted in Section 307.8. Sampling and analytical procedures to assess standards attainment are described in Section 307.9. Site-specific standards for designated water bodies are individually listed in appendices.

Point Source Control Program

The TNRCC is given broad authority by Chapter 26 of the TWC to adopt rules and procedures to control and limit discharges of wastewater into or adjacent to water bodies in the State. Specifically, wastewater must be treated to a certain standard before being discharged.

On September 14, 1998 the TNRCC assumed the federal NPDES program under the CWA and administers the TPDES program governing dis-

charges from all point sources in the state (except for oil and gas discharges, outside of TNRCC jurisdiction). TPDES Permits are developed to be consistent with state and federal statutes, regulations and rules and also incorporate state and federal policies.

In industrial TPDES permits (including CAFO permits), technology based effluent limitations are at least as stringent as Best Practical Control Technology Currently Available (BPT), Best Available Technology Economically Achievable (BAT), and Best Conventional Pollutant Control Technology (BCT) limitations in accordance with Effluent Limitations and Standards as promulgated for categorical industries. Production based limitations are based on a reasonable measure of actual production levels at a facility. Mass limitations for concentration-based guideline limits are developed using the appropriate wastewater flows. In municipal TPDES permits, technology-based effluent limitations are consistent with any applicable Watershed Protection Rules and at least as stringent as secondary treatment requirements developed by Texas, as found in 30 TAC Chapter 309. In Texas, CAFO permit requirements are more stringent than the minimum technology guidelines. Additional CAFO requirements govern land application of wastewater and solid waste. CAFO permits establish management practices to abate and prevent pollutant runoff.

If more stringent than either the technology guidelines, an applicable watershed protection rule, or the secondary treatment rules, effluent limitations and other permit provisions must meet applicable surface water quality standards. These standards are implemented into industrial, CAFO, and municipal TPDES permits. When point source discharges or nonpoint source impacts have reduced or eliminated the assimilative capacity of a water body, such that the water quality standards cannot be attained, Wasteload Evaluations (WLEs) or TMDLs have been established as a water quality management plan to maintain or restore water quality.

Municipal TPDES permits include provisions for the management of domestic sewage sludge. The TNRCC has broad authority as described in Chapter 361 of the Texas Health and Safety Code to control municipal solid waste. The TNRCC has adopted 30 TAC Chapter 312 which implements all of the federal sewage sludge requirements (40 CFR Part 503). TNRCC also authorizes and controls the use and disposal of water treatment sludge. All industrial TPDES permits require that industrial solid waste, including hazardous waste, be managed and disposed of in accordance with 30 TAC Chapter 335 and any applicable requirements of the Resource Conservation and Recovery Act (RCRA). These requirements reduce or eliminate nonpoint source impacts, which might otherwise adversely affect water quality.

Among all states, Texas has one of the highest number of point source discharges, due to the geographical size of the state, its economy, and patterns of water district proliferation surrounding several of the major urban centers. In February, 2000, Texas had 847 industrial, 2360 municipal, and 519 CAFO permits issued in the state. Of these, 565 industrial and municipal facilities are not subject to TPDES since discharges are not into a surface water, but instead rely upon storage of wastewater, irrigation, evaporation, or subsurface percolation. Of the municipal dischargers, 128 must maintain a pretreatment program to control discharges of wastewater from industrial users of the sewer system, in order to prevent pass-through of pollutants or interfere with wastewater treatment.

In 1987, Congress amended the CWA to specify that storm water discharges from certain activities are point sources subject to the requirements of NPDES. In this manner, certain intermittent and episodic discharge events previously considered as the discharge of pollutants from *nonpoint* sources, became *point* sources. Initially, the EPA began implementation of Phase 1 (see description below) of the NPDES storm water program. The TNRCC did not begin implementation of a similar state program, due to its intent to assume NPDES and avoid dual permitting. With the assumption of NPDES in 1998, TNRCC assumed responsibility for implementation of a storm water program under the TPDES program. Additionally, with the advent of 1999 regulations by EPA, all states that carry out the NPDES program must begin implementation of Phase 2 (see description below) of the program, as well.

Phase 1 of the TPDES storm water program includes the following regulated categories.

- The discharge of storm water associated with industrial activity (largely identified by specific SIC codes), and also includes storm water associated with construction activities which disturb greater than five acres of land.
- The discharge of storm water from large and medium municipal separate storm sewer systems (MS4s). Large and medium systems are ones which serve a population greater than 100,000.

Phase 2 of the TPDES storm water program includes the following regulated categories.

- The discharge of storm water associated with construction activities which disturb greater than one and less than five acres of land.
- The discharge of storm water from small MS4s. Requirements generally include cities of greater than 10,000 population, but urban areas and other high density complexes (prisons, universities, military bases) adjacent to cities may be subject to the requirements as well.

Nonpoint Source Pollution Control Program

Characteristics of Pollution from Storm Water

Storm water pollution is a form of water pollution that originates from urban and rural landscapes. Common and everyday activities such as landscape maintenance, the operation of automobiles, farming, and building construction can cause water pollution under certain circumstances. Pollution occurs when rainfall runoff or infiltrating groundwater carry accumulated pollutants to receiving water bodies such as surface lakes, streams, and coastal waters or groundwater aquifers. Humans or livestock, when concentrated in a relatively small space (such as in a city or a concentrated animal feeding operation), can cause significant pollutant discharges following rainfall and the transport of accumulated contaminants. The fertilizers used to maintain urban landscapes and to produce agricultural crops can cause excessive growths of aquatic vegetation (such as algae) and can lead to unhealthy concentrations of nitrates in groundwater used as drinking water supply. Metals and organic compounds associated with the operation of automobiles can be toxic or carcinogenic to human health and to wildlife. Air emissions that originate from a multitude of industrial, urban, and mobile sources are deposited onto the ground, with the potential to add pollutants to surface and ground water when rainfall runoff occurs. Sediments that erode from land areas disturbed by construction and agricultural activities can impair aquatic wildlife habitats, shorten the design life of reservoirs, and act as a carrier for other contaminants.

Pollution from storm water is differentiated from conventional sources of water pollution, such as the discharges of wastewater from municipal and industrial wastewater treatment plants. These “point source” discharges are strictly regulated by TPDES permits containing effluent limits, monitoring requirements and enforcement mechanisms. As described above in the point source control section, a large subset of urban storm water is now controlled under the TPDES program and identified as point source discharges of storm water. Pollution from the remainder of storm water not under the TPDES program is called “nonpoint source” pollution because it originates from dispersed and diffuse locations.

Water pollution problems from storm water are less obvious and are not as easy to control through the traditional "end-of-pipe" treatment strategies that have been useful for the control of wastewater discharges. The duration, intensity, and areal extent of rainfall events, combined with the complex nature of land use activities and the differing characteristics of the landscape, means that storm water pollution exhibits highly variable temporal and spatial characteristics. The lack of a single identifiable

source or action responsible for causing a water quality problem makes it difficult to establish cause-and-effect relationships. The familiar and often necessary nature of the activities that lead to pollution from storm water makes it difficult to appreciate the potential adverse consequences of those activities. When a NPS assessment has been completed or when existing regulations establish a NPS control, it is generally referred to as a best management practice, or BMP. BMPs are the most effective practice or combination of practices identified for the control of NPS pollution. BMPs may be structural, such as detention ponds or filter systems, or nonstructural, such as riparian buffer zones along stream banks. BMPs also include activities such as education of the public on NPS pollution.

Assessments of Pollution from Storm Water

The EPA reports that, on a national basis, storm water runoff contributes to more water quality impairments than do discharges from municipal and industrial wastewater treatment facilities. In Texas, nonpoint sources contribute to pollution in 220 of the 238 water bodies (92 percent) identified as impaired or threatened on the 2000 303(d) List.

Section 319 of the Clean Water Act specifies requirements for state NPS pollution abatement programs. These requirements include provisions for the preparation and submittal of a NPS Assessment Report. The statute and the associated guidance specifies that the assessment report is to identify waters that were impaired, threatened by, or vulnerable to NPS pollution; characterize the sources that contribute to those impacts; and describe programs and methods for controlling it. The TNRCC originally prepared a NPS Assessment Report in 1988. Updates were completed since then, including the latest Assessment Report completed in 1999 and approved by EPA on February 25, 2000. This document is available from TNRCC and is found at the TNRCC Web site. The document is entitled *Texas Nonpoint Source Pollution Assessment Report and Management Program* (TNRCC, 2000c).

1999 NPS Assessment Report: Extent and Nature of the Problem in Texas Surface Waters

The TNRCC assesses nonpoint source pollution in Texas in accordance with Section 319(a) of the Clean Water Act, with the cooperation of the TSSWCB and other interested parties in the state. The 1999 assessment compiled available information from various nonpoint source water quality assessments. Statewide water quality monitoring data, watershed characterization information, and information solicited through an inter-governmental coordination and public participation process were used to produce the assessments of NPS impairments to Texas surface waters.

Identification of NPS Impaired Waters

Texas' §319(a) assessment of NPS-impaired waters is based on its CWA §305(b) water quality inventory and §303(d) list of impaired and threatened waters. In preparing the state's §305(b) assessment, the TNRCC compares water quality monitoring data against criteria in the Texas Surface Water Quality Standards and EPA §305(b) guidance to determine how well the waters of the state support their designated beneficial uses. Section 303(d) of the Clean Water Act requires the state to identify all waters within its boundaries that do not meet water quality standards and establish a priority listing of those waters for remedial or protective action.

The Texas §319(a) assessment focuses on those surface waters which have been degraded by nonpoint source pollution, as identified in the state's §303(d) list. NPS-degraded surface waters appearing on this list will be targeted by the state for additional NPS monitoring and restoration activities.

During the next five years, the state will be refining the process for assessing and ranking water bodies and the process used for preparing the CWA §305(b) report, the CWA §303(d) list, and the §319(a) NPS list. Basin analyses performed by the TNRCC and regional partners under the guidance of the CRP are the foundation for the state's CWA §305(b) report and subsequent statewide ranking and prioritization of NPS segments. The long-term objective of the Nonpoint Source Program is to update the assessment on a schedule which coincides with the preparation of the Texas §305(b) report and the water quality assessments prepared by the CRP.

Texas' NPS Management Approach

Previous state Management Programs for the TSSWCB and the TNRCC placed priority on working closely with federal, state, and private agencies to promote NPS pollution prevention and abatement projects. The majority of these projects either demonstrated innovative NPS pollution abatement technologies or were statewide NPS pollution educational projects. Although these past projects have been effective in terms of accomplishing work plan tasks and raising awareness of NPS pollution, it has been difficult to quantify the success of these projects in terms of water quality improvements.

NPS management presents an enormous challenge to federal, state, and local agencies because of the difficulty in identifying the sources of the pollution, the relatively low public awareness of the problem, the huge variation in vegetation and land types, and the economic and technical infeasibility of some best management practices. Even though significant

funding sources exist, there remains a gap between available funding and the amount needed to address all program priorities.

The state's management program for nonpoint source pollution utilizes baseline water quality management programs and regulatory, non-regulatory, financial, and technical assistance approaches to achieve a balanced NPS management program. These programs include ongoing work to update and establish water quality standards and monitor and assess water bodies for water quality impacts.

State resources for implementation will focus on water bodies that do not meet their standards as scoping and assessment activities are initiated in each individual watershed. Through basin steering committees and local watershed action committees, local stakeholders are encouraged to participate in the assessment and evaluation of a watershed's water quality impairments, as well as in the development and implementation of necessary management strategies. Watershed analyses are used to specify quantifiable targets for water quality improvement, and watershed action plans outline activities necessary to attain and maintain applicable water quality standards. The Nonpoint Source Program is active in supporting each phase of the watershed management process, from initial identification of NPS-impaired waters for the §303(d) and §319(a) lists to implementation and oversight of priority management activities.

Nonpoint Source Program Goals and Objectives

Within its cooperative, watershed-based framework, Texas has identified goals and objectives to guide nonpoint source program activities. These goals and objectives encompass elements intended to provide a strong foundation for maintaining a comprehensive nonpoint source program. These goals and objectives have been formally adopted and approved by the TNRCC Commission, the Texas Governor, and the EPA Regional Administrator and are contained in the *Texas Nonpoint Source Pollution Assessment Report and Management Program* (TNRCC, 2000c).

Nonpoint Source Program Highlights

Many nonpoint source assessments and implementation projects have been occurring and are ongoing in Texas. These include activities funded by the EPA through annual §319 awards to the TNRCC and TSSWCB. Additional funding through state fees to support the Texas Clean Rivers Program and general revenue provided by the Texas Legislature fund NPS-related assessment activities. Other federal, state, and local agencies provide funding support of a diverse amount of activity which results in nonpoint source pollution abatement in this state. Readers interested in detailed descriptions and highlights are referred to the *Texas Nonpoint Source Pollution Assessment Report and Management Program* and also

to the *1999 Annual Report: Texas Nonpoint Source Pollution Management Program*. Both documents describe the entities involved in Texas, recent activities, and nonpoint source pollution abatement success stories.

Coastal Zone Act Reauthorization Amendments (CZRA)

The Texas Coastal Management Program (CMP) was approved by the National Oceanic and Atmospheric Administration (NOAA) on January 10, 1997. The Texas CMP is administered by the Texas Coastal Coordination Council (TCCC) and staff of the Texas General Land Office. The CCC includes as one member Chairman of the TNRCC. Section 6217 of the CZRA requires each state with an approved CMP to develop a federally approvable program to control coastal nonpoint source pollution. The program must be submitted within 30 months of CMP approval. As a result, the *Texas Coastal Nonpoint Source Pollution Control Program* was submitted in December, 1998 by the CCC (TCCC, 1998). The program recognizes the TNRCC and the TSSWCB as holding primary responsibility over the development and implementation of the program. Other supporting agencies involved also include the GLO, TPWD, Texas Department of Transportation (TXDOT), and the RCT.

At this time, the program is under review by NOAA and EPA. In response to comments on the initial submittal, the participating agencies are currently developing amendments to the 1998 program for consideration by TCCC and submittal to NOAA. Texas currently estimates approval of the program in mid-2001. Additional activities include the development of 15-year Program Strategies and 5-year Implementation Plans for the coastal nonpoint program, consistent with 1999 guidance released by EPA and NOAA.

Total Maximum Daily Loads

Restoration and maintenance of surface water quality so that designated and attainable uses are met is one of the most important priorities of the TNRCC. The TNRCC implements this water pollution control program by identifying water bodies that do not meet surface water quality standards (development of 303(d) lists), by developing TMDLs for these impaired water bodies, and by ensuring that water quality standards are periodically reviewed and revised as appropriate (TNRCC, 1999d). When approved, TMDLs are incorporated into the TNRCC's water quality management plan.

303(d) Listing Process

The 303(d) listing process is based on the same guidance and data screening procedures developed for the 305(b) water quality inventory. Therefore, the 305(b) inventory and the 303(d) list are fundamentally consistent, with some minor differences that can be explained by the differing purposes and perspectives of the two documents. The 303(d) list is written in language that is more efficiently communicated to a public audience. Some water bodies identified as not supporting designated uses in the 305(b) Report may not be placed on the 303(d) List, because the impairments were identified after the public comment period. The 305(b) inventory identifies not only impairments but also water quality concerns that are worthy of note and technical investigation but do not constitute use impairments. The 303(d) list, on the other hand, identifies only known and reasonably verifiable impairments or threats.

The 305(b) Report and other available data and information on water quality are used to produce the State of Texas CWA Section 303(d) List. Under Section 303(d) of the CWA, states are required to identify and list water bodies that do not meet, or are not expected to meet, applicable water quality standards for their designated uses [Title 40 Code of Federal Regulations (CFR) Part 130.7]. States are required to prioritize all 303(d) listed water bodies for TMDL project initiation and submit the list to the EPA for approval. Federal regulations also require states to complete a TMDL for each water body as well as each pollutant listed on the 303(d) list. For example, if a stream is impaired as a result of elevated levels of cadmium and low dissolved oxygen levels, two individual loading allocations would be required: one for cadmium and another for dissolved oxygen. All TMDLs must be submitted to EPA for approval.

The state's 305(b) assessment is conducted within one of the five basin groups established by the TNRCC for wastewater discharge permitting and watershed management purposes, following a rotating five-year cycle. The exception to this basin group focus is for those uses and criteria directly related to human health, which are assessed statewide every year. Annual updates to the 303(d) list follow these assessments.

Each annual update to the 303(d) list follows the same basic sequence of steps which are:

- selecting acceptable data and information used to develop the state's 303(d) list;
- assessing these data and information to determine which water bodies are threatened or impaired (described in greater detail in *Guidance for Screening and Assessing Texas Surface and Finished Drinking Water Quality Data*);

- preparing a draft list;
- ranking the water bodies for TMDL development;
- revising and finalizing the list based on public input.

As required by CWA §303(d) and CFR §130.7(B)(5), the TNRCC considers “all existing and readily available water quality-related data and information” during the development of the 303(d) list. The TNRCC solicits data and information primarily through the established public outreach mechanisms of the CRP, and through posting a draft 303(d) list on the Internet. All data and information received are initially considered when identifying impaired and threatened water bodies. However, the TNRCC and EPA recognize that there are some boundaries that must be established when considering data and information used for listing. These boundaries are:

Time limitations. Data collected prior to the most recent five year assessment period do not adequately reflect current conditions and are therefore not considered.

Geographic focus. In an effort to focus monitoring, assessment, and public outreach resources more intensively, the TNRCC limits (with a few exceptions) the assessment to priority basin groups of the state. By targeting assessment activities, the TNRCC and the CRP partners will, over time, be able to perform a better evaluation of waters in the state.

Data quality. In order to increase and improve the data available to the TNRCC for water quality management, CRP staff work closely with local and regional agencies and other interest groups to develop and implement data collection efforts under an established quality assurance/quality control program. Assessment of data collected using consistent and scientifically rigorous water quality sampling methods ensures a predictable process for all stakeholders. Furthermore, given the regulatory implications associated with the use of water quality data, greater emphasis is placed on requiring the highest quality data feasible. For this reason, the TNRCC requires that data used for the development of the draft list be collected under a TNRCC-approved quality assurance project plan. Data submitted to the TNRCC for consideration in the listing process and not collected under such a plan must be accompanied by documentation of quality assurance methods used in collecting the data that can be evaluated by TNRCC water quality staff.

Data resident in the TNRCC integrated database (surface water quality monitoring module) are used to compile the draft list. This database consists of water quality data collected by the TNRCC, the USGS, and various planning agencies and other entities through the CRP. Data must be in a form that does not require extensive data format manipulation to be

useable for decision making. To provide additional consistency and scientific dependability to the 303(d) listing process, data must meet minimum quality assurance/quality control requirements established by the TNRCC.

Other important sources of data and information used to develop the draft list are:

- Texas Department of Health fish consumption advisories, aquatic life and shellfish waters closures, and fecal coliform data for oyster waters.
- The TNRCC's Chemical Monitoring System database on finished drinking water quality for pollutants related to surface water quality. Drinking water system samples are collected under quality assurance project plans in compliance with regulations passed in support of the federal Safe Drinking Water Act.

To refine the draft 303(d) list, the TNRCC relies on a formal public comment period to solicit additional data and information to support the listing process. Other data and information can be used to support or refute results of the initial screening analysis and to determine the priority ranking of water bodies. These data and information may also be used to direct future water quality monitoring activities. The value and accuracy of these data are evaluated by TNRCC water quality staff on a case-by-case basis. As the state's watershed management cycle matures and becomes institutionalized, the data and information used will become more comprehensive as other state, regional, or local entities learn about the schedule and submit quality-assured data in a timely manner.

TMDL Process

The TMDL Program focuses on impaired or threatened streams, reservoirs, and estuaries (water bodies) as determined through the 305(b) assessment and 303(d) listing processes (Figure 52). The primary objective of the TMDL Program is to restore and maintain the beneficial uses (e.g., drinking water, recreation, aquatic life) of impaired or threatened water bodies (TNRCC, 1999d). Achieving this objective through the TMDL process will be a major component of the state's watershed management efforts over the next 10 to 20 years.

The TNRCC has established a schedule for determining when and where TMDL projects will be initiated. During the 303(d) listing process, water bodies are assigned a High, Medium or Low priority for TMDL development. The criteria for assigning priorities are outlined in "Methodology for Developing the Texas Clean Water Act Section 303(d) List." This

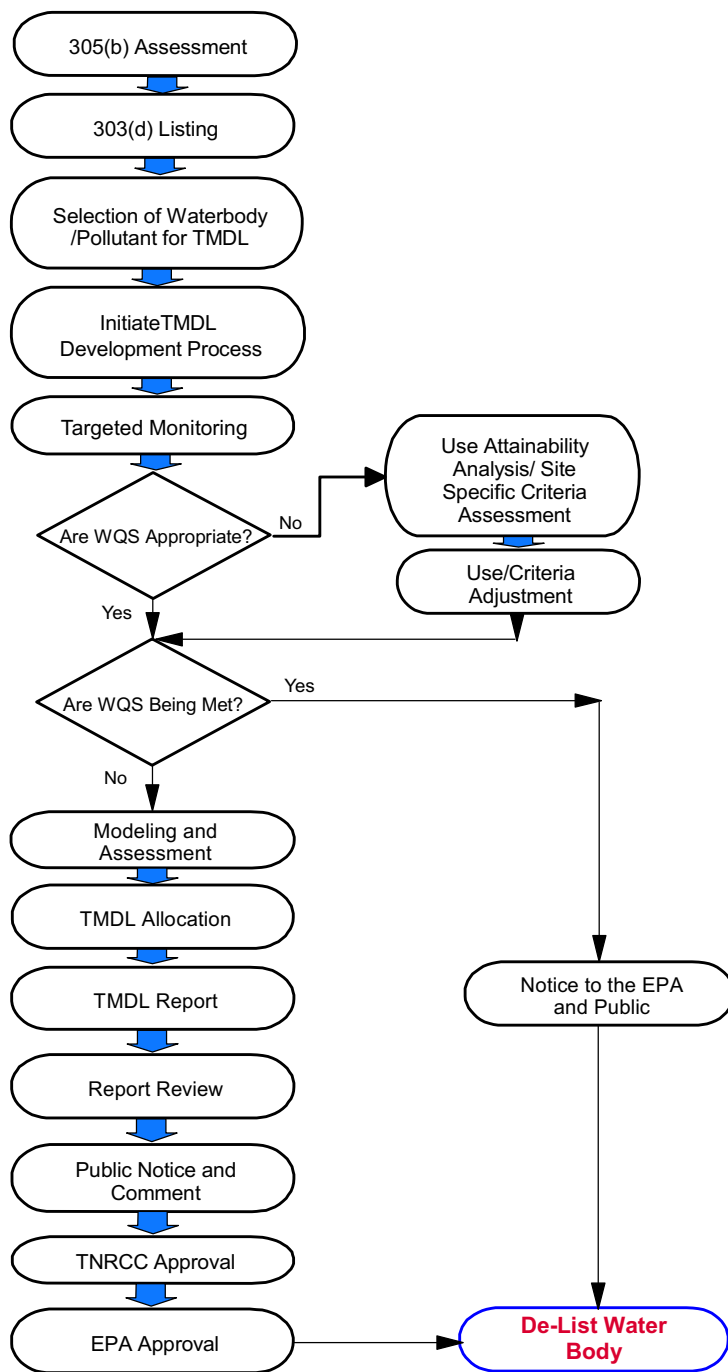


Figure 52. The TMDL Development Process

ranking is important, but not the only factor used to establish the priorities for developing TMDLs. Additional factors considered in developing the TMDL schedule for listed water bodies include:

Geographic Focus Area. The state's rotating basin management cycle is the mechanism for deciding where TMDLs are targeted for initiation in any given year. However, water bodies listed for human health concerns may be initiated on any given year.

Watershed Proximity and Related Pollutants. In order to make more efficient use of the state's resources, TMDLs may be scheduled as one project for multiple water bodies either in close proximity or for related pollutants. In this case, one or more water bodies ranked as a low priority for TMDL development may be scheduled ahead of water bodies ranked as medium, because the lower ranked water body is part of a larger project.

Local Support for TMDL Development. Local resources and commitment to a particular water body may accelerate TMDL development.

Data Availability. For most 303(d)-listed water bodies, additional data collection will be required for TMDL development. For water bodies where sufficient quality-assured data is available, TMDLs may be scheduled earlier than if such data did not exist.

International and Interstate Waters. The technical complexities and multi-jurisdictional aspects associated with international or interstate water bodies influence when they are scheduled for TMDL development.

Targeting by Strategy. Depending on the impairment, the TNRCC initially addresses water bodies in one of four ways:

- initiate TMDL development if additional data is not required,
- initiate additional data collection to verify the extent and severity of the impairment and/or to support the TMDL model,
- initiate an evaluation of the appropriateness of the existing standard, or
- build on existing efforts that are addressing the same water body and the same pollutant. Each of these "TMDL equivalents" will be a unique case and require a process specific to the project.

The four major steps in the TMDL development process include contract initiation, targeted monitoring, load allocation, and TMDL approval, as described below.

Contract Initiation

After determining the particular strategy for a water body/pollutant and scheduling the project, the TNRCC allows 6-12 months for contract development/approval. This step includes contractor selection, contract development, and approval by all parties.

Targeted Monitoring

Additional water quality data collection is often the first step to address a 303(d)-listed water body. Additional data may be needed to verify the extent and severity of the impairment, to evaluate existing water quality standards, or to support TMDL development. Watershed land use/land cover, hydrography and hydrology data may also be collected to support TMDL assessment and/or modeling. A watershed stakeholder committee may also be convened during this stage to provide input into the TMDL development process.

Over the course of some TMDL projects, a key aspect of water quality planning and management that may come into greater focus is the water body's present water quality standard. As a TMDL project is conducted, two alternative outcomes may materialize as existing and additional data are assessed to characterize the constituent of concern and watershed conditions:

- the TNRCC may determine that it is appropriate and feasible to conduct a UAA to have the designated use changed [40 CFR §§131.10(h) and 131.10(d)]; or
- the water quality criterion that was exceeded, placing the water body on the 303(d) list, may not be appropriate and should be replaced by a site-specific criterion, which would result in a change to the water quality standards, screening criteria, or both for some parameters [40 CFR §131.11(b)].

The TNRCC recognizes that, within the current regulatory framework, changes to designated uses may be feasible in very limited situations only. The TNRCC is interested in establishing more site-specific water quality criteria for a variety of technical, scientific, economic, and administrative reasons. Consideration of the appropriateness of an existing water quality criterion is an important early step of every TMDL project.

TMDL Allocation

The establishment of a TMDL involves four components and culminates in allocating pollutant loads among various sources:

Identify the water quality target. TMDL projects must identify a quantifiable water quality target for each constituent that causes a body of water to appear on the 303(d) list. For most pollutants, the primary water quality target has been established by the TNRCC through the TSWQS (30 TAC §§307.1 –307.10).

Assess current watershed and water quality conditions. In most TMDL projects, it is necessary to collect additional water quality data and other information to adequately characterize the water body, its watershed, and the nature of impairment. However, in some cases, sufficient data may already be available.

Analyze pollutant sources (point, nonpoint, natural background, atmospheric deposition). Before pollutant loads are allocated among sources, the location and types of sources, and the current and projected pollutant load for each source are identified.

Allocate pollutant loads. The TMDL loading allocation process culminates in allocating pollutant loads among various point, nonpoint, and natural background sources in the watershed. This phase determines the current pollutant loading in the water body and the estimated loading needed to restore water quality. Pollutant loads are allocated among the sources throughout the watershed and often involves the use of water quality models.

TMDL Approval

The TNRCC is required to submit all TMDLs to EPA for review and approval. This process may take as long as a year. This process is detailed in *Developing Total Maximum Daily Load Projects in Texas: A Guide for Lead Organizations* (TNRCC, 1999d). Once the TMDL allocation is completed an implementation plan summarizing the regulatory and voluntary management strategies needed to restore water quality is prepared by the TNRCC.

Coordination with Other Agencies

There are many state and local agencies of government and other entities which are involved with the TNRCC water quality management directly or with which significant program coordination occurs (Table 116). An asterisk next to an agency in Table 116 indicates that the agencies have executed a formal agreement, such as a contract or memorandum of understanding, relating to water quality monitoring or enforcement of water quality controls.

Table 116. Agencies Involved with the TNRCC in Water Quality Management Activities

State or Local Agency/Entity	Relevant Responsibilities
Texas Water Development Board*	planning and financing of water-related development monitoring of the quantity and quality of ground water
Texas Parks & Wildlife Department*	development and protection of water-based recreational and wildlife resources
Texas General Land Office*	stewardship and leasing of state-owned lands, including submerged land in coastal areas; administrative arm of the Coastal Coordination Council and Texas CMP
Texas Department of Transportation*	construction, maintenance, and operation of Texas roadways local sponsor for improvements and maintenance of intracoastal waterway
Texas Department of Health*	monitors contamination associated with fish tissue and shellfish
Texas Railroad Commission*	regulation of surface mining, oil & gas related discharges, and associated spill response
Texas Groundwater Protection Committee	interagency coordination on groundwater protection sampling and response to agricultural pesticide contamination incidents
Texas Alliance of Groundwater Districts	umbrella organization over groundwater conservation districts in the management of groundwater resources
Univ. of Texas, Bureau of Economic Geology	research and technical services associated with groundwater and mineral resources
Texas State Soil & Water Conservation Board*	management of agricultural and silvicultural nonpoint source pollution
Texas Agricultural Extension Service*	administered by Texas A & M Univ.; provides education and outreach to agricultural community; supports TNRCC TMDL program
Texas Agricultural Experimental Station*	administered by Texas A & M Univ. as official state agricultural research agency
Texas Department of Agriculture*	regulatory agency over agricultural pesticides
Texas Forest Service*	part of Texas A & M Univ. system which provides technical assistance and monitoring of best management practices in forestry operations
Texas Institute for Applied Environmental Research	part of Texas A & M Univ. system which conducts applied research relating primarily to agricultural-related environmental issues
River Authorities*	designated by state legislation with authority in one or more counties; many are responsible under the Clean Rivers Program for surface water quality monitoring and assessment of water quality within specified watersheds
Councils of Government*	several are designated by Texas Governor with authority over water quality management planning consistent with §208 of federal CWA

*Indicates agency has executed formal agreement with the TNRCC

